

NATURAL RESOURCES CONSERVATION SERVICE

VIRGINIA CONSERVATION PRACTICE STANDARD

CONSERVATION CROP ROTATION

(Acre)

CODE 328

DEFINITION

Growing crops in a recurring sequence on the same field.

grown occasionally only to facilitate renovation or re-establishment of perennial vegetation.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following:

- Reduce sheet and rill erosion
- Reduce soil erosion from wind
- Maintain or improve soil organic matter content
- Manage the balance of plant nutrients
- Improve water use efficiency
- Manage plant pests (weeds, insects, and diseases)
- Provide food for domestic livestock
- Provide food and cover for wildlife

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land where crops are grown, with the exception of pastureland, hayland, or other land uses where crops are

CRITERIA

GENERAL CRITERIA APPLICABLE TO ALL PURPOSES

Crops shall be grown in a planned, recurring sequence as outlined in Plans and Specifications.

Crops shall be adapted to the climatic region, the soil resource, and the goals of the producer. Adapted crops and varieties, listed in appropriate university publications or other approved sources, shall be selected.

A conservation crop rotation may include crops planted for cover or nutrient enhancement.

Crops shall be selected that produce sufficient quantities of biomass at the appropriate time to reduce erosion by water or wind to within acceptable soil loss levels. In those instances where crops selected do not produce sufficient biomass to meet this criteria, a cover crop (see Virginia Conservation Practice Standard *Cover Crop (Code 340)*) or other appropriate practices shall be used. The amount of biomass needed shall be determined using current approved erosion prediction technology. Soil loss estimates shall account for the effects of other practices in the conservation management system.

Nutrient and pest management will be applied according to Virginia Conservation Practice Standards *Nutrient Management (Code 590)* and *Pest Management (Code 595)*.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

ADDITIONAL CRITERIA TO MAINTAIN OR IMPROVE SOIL ORGANIC MATTER CONTENT

Crops shall be selected that produce the amount of plant biomass needed to maintain or improve soil organic matter content, as determined using the current approved Soil Conditioning Index Procedure or determined by approved research.

The biomass will be sufficient to control erosion within the soil loss tolerance (T) or other planned soil loss objective meeting quality criteria in Section III of the Field Office Technical Guide (FOTG).

The amount of biomass needed shall be determined using the Revised Universal Soil Loss Equation (RUSLE). Soil loss calculations shall account for the effects of other practices in the conservation management system.

If partial removal of residue by means such as baling or grazing occurs, enough residue shall be maintained to achieve the desired soil organic matter content goal.

Cover and green manure crops planted specifically for soil improvement may be grazed, as long as grazing is managed to retain adequate biomass.

ADDITIONAL CRITERIA TO MANAGE THE BALANCE OF PLANT NUTRIENTS

Crop selection and sequence shall be determined using an approved nutrient balance procedure.

When crop rotations are designed to add nitrogen to the system, nitrogen-fixing crops shall be grown immediately prior to or interplanted with nitrogen-depleting crops.

To reduce excess nutrients, crops or cover crops having rooting depths and nutrient requirements that utilize the excess nutrients shall be grown.

ADDITIONAL CRITERIA TO IMPROVE WATER USE EFFICIENCY

Selection of crops and varieties, sequence of crops, or the annual decision to plant a crop or

to fallow, shall be determined using an approved water balance procedure.

ADDITIONAL CRITERIA TO MANAGE PLANT PESTS (WEEDS, INSECTS, DISEASES)

Crops shall be alternated to break the pest cycle and/or allow for the use of a variety of control methods. Affected crops and alternate host crops shall be removed from the rotation for the period of time needed to break the life cycle of the targeted pest.

Resistant varieties, listed in appropriate university publications or other approved sources, shall be selected where there is a history of a pest problem.

ADDITIONAL CRITERIA TO PROVIDE FOOD FOR DOMESTIC LIVESTOCK

Crops shall be selected to balance the feed supply with livestock numbers. The needed amount of selected crops shall be determined using an approved forage-livestock balance procedure.

ADDITIONAL CRITERIA TO PROVIDE FOOD AND COVER FOR WILDLIFE

Crop selection to provide either food or cover for the targeted wildlife species will be grown, managed, or left unharvested as per the needs of the targeted wildlife as determined by an approved habitat evaluation procedure.

CONSIDERATIONS

When used in combination with Virginia Conservation Practice Standard *Contour Stripcropping* (Code 585), the crop sequence should be consistent with the stripcropping design.

When used in combination with residue management practices, selection of high residue producing crops and varieties, use of cover crops, and adjustment of plant population and row spacing can enhance production of the kind, amount, and distribution of residue needed.

Where maintaining or improving soil organic matter content is an objective, the effects of this practice can be enhanced by managing crop residues and tillage practices, utilizing animal wastes, or applying mulches to supplement the biomass produced by crops in the rotation.

Where excess plant nutrients or soil contaminants are a concern, utilizing deep rooted crops or cover crops in the rotation can help recover or remove the nutrient or contaminant from the soil profile.

Where precipitation is limited, seasonal or erratic moisture can be conserved for crop use by maintaining crop residues on the soil surface to increase infiltration and to reduce runoff and evaporation. Where winter precipitation occurs as snow, additional moisture can be obtained for crop use by trapping snow with standing residue, windbreaks, or other barriers.

Crop damage by wind erosion can be reduced by selecting crops that are tolerant to abrasion from wind blown soil or tolerant to high wind velocity. If crops sensitive to wind erosion damage are grown, the potential for plant damage can be reduced by crop residue management, field windbreaks, herbaceous wind barriers, intercropping, or other methods of wind erosion control.

Where pesticides are used, consider application methods and the crop rotation to avoid negative impacts on the following crop due to residual herbicides in the soil or adverse effects on aquatic wildlife or habitat through runoff.

Soil compaction can be reduced by adjusting crop rotations to include deep-rooted crops that are able to extend to and penetrate the compacted soil layers and avoiding crops that require field operations when the soils are wet.

Leaving several rows unharvested around the edges of the field will provide protection and/or food for overwintering wildlife.

Crop plantings may be developed to benefit particular communities, species or life stages of wildlife. Food plots or crops for wildlife could be provided as part of a habitat restoration project as an initial food and cover source for

wildlife until food and cover producing vegetation becomes established.

Crop residues may be a valuable food source for wintering wildlife where winter browse is sparse.

Careful consideration should be given to pesticide use if applied to crops raised for wildlife.

Develop a cropping sequence that is commercially feasible and aids in improving or maintaining water quality and in controlling insects, diseases, weeds and other pests.

The cropping sequence is considered established when the crop with the greatest soil improving potential has been harvested and that crop's residue managed as planned.

Consider the need for using associated practices to assist in controlling erosion within the soil loss tolerance (T) or any other planned soil loss objective.

Additional practice information can be found on the Virginia Conservation Practice Job Sheet *Conservation Crop Rotation*.

PLANS AND SPECIFICATIONS

Specifications for this practice shall be in accordance with the stated criteria and recorded in the conservation plan case file. All plans and specifications are to be prepared for specific field sites based on this standard.

A conservation crop rotation will be developed for all cropland fields on each tract. The conservation crop rotation will be documented in the conservation plan utilizing one or more of the following methods: approved specifications sheets, job sheets, narrative statements in the conservation plan, or other approved documentation.

This plan shall include:

1. A map showing the tract boundaries, field boundaries, and field numbers
2. The main use of each field as designated in the conservation plan (cropland,

hayland, etc.)

3. The number of years in the rotation and the general crop (row crop, small grain, grass, etc.) during each year of the rotation
4. The appropriate soil loss calculations to justify the selected crop rotation
5. The appropriate approved conservation practice narrative

Supporting data and documentation for the completed conservation cropping sequence (required checkout notes), will be recorded and maintained as part of the conservation plan. The following information will be recorded.

1. Field location: tract number and field number
2. Acres in the field
3. The number of years in the rotation and the crop sequence
4. The before and after soil loss

OPERATION AND MAINTENANCE

Rotations shall provide for acceptable substitute crops in case of crop failure or shift in planting intentions for weather related or economic reasons. Acceptable substitutes are crops having similar properties that meet the criteria for all the resource concerns identified for the field or treatment unit.

In areas where summer fallow is practiced, the decision to plant a crop or fallow shall be made annually based on soil moisture at planting time. Fields shall be fallowed only when soil moisture is not adequate to produce a crop. If moisture supply is adequate but limited, short-season shallow-rooted crops shall be selected and grown. Deep-rooted crops shall follow shallow-rooted crops in subsequent years, if needed, to utilize all plant available water in the root zone.

REFERENCES

1. A Handbook of Agronomy, Publication 424-100, published by Virginia Cooperative Extension Service.
2. Virginia Pest Management Guide, published by the Virginia Cooperative Extension Service (Most current publication, i.e. current year).
3. Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE), USDA Agricultural Handbook 703.

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Approved Practice Narratives

(Acre)

CODE 328

328 D1 Conservation Crop Rotation: Continuous Crop: This field will be cropped using continuous small grain and/or row crops. The date on the chart shown below is the date the rotation is to begin.

328 D2 Conservation Crop Rotation: Two year rotation. The cropping sequence will consist of: First year, row crop; Second year, small grain and/or grass. This rotation will be repeated every 2 years. Additional years of small grain or grass may be used in this rotation. The date on the chart shown below is the date the rotation is to begin.

328 D3 Conservation Crop Rotation: Two year rotation - double crop. The cropping sequence will consist of: First year, row crop; Second year, small grain. A no-till row crop will be planted in the small grain residue. This sequence will be repeated every 2 years. Additional years of small grain or grass may be used in this rotation. The date on the chart shown below is the date the rotation is to begin.

328 D4 Conservation Crop Rotation: Three year rotation. The cropping sequence will consist of: First year, row crop/small grain; Second year, small grain/grass; Third year, grass. The sequence will be repeated every 3 years. Additional years of small grain or grass may be used in this rotation. The date on the chart shown below is the date the rotation is to begin.

328 D5 Conservation Crop Rotation: Four year rotation. The cropping sequence will consist of: First year, row crop; Second year, row crop/small grain; Third year, small grain/grass; Fourth year, grass. The sequence will be repeated every 4 years. Additional years of small grain or grass may

be used in this rotation. The date on the chart shown below is the date the rotation is to begin.

328 D6 Conservation Crop Rotation: Four year rotation. The cropping sequence will consist of: First year, row crop/small grain; Second year, small grain/grass; Third year, grass; Fourth year, grass. The sequence will be repeated every 4 years. Additional years of small grain or grass may be used in this rotation. The date on the chart shown below is the date that the rotation is to begin.

328 D7 Conservation Crop Rotation: Five year rotation. The cropping sequence will consist of: First year, Second year, Third year, and Fourth year, grass and/or legume; Fifth year, row crop. The sequence will be repeated every 5 years. Additional years of grass and/or legume may be used in this rotation. The date on the chart shown below is the date the rotation is to begin.

328 D8 Conservation Crop Rotation: These fields will be farmed on a rotation of 2 years of row crops and 3 or more years of hay. The planned date indicates the beginning of the row crop portion of the rotation. See Job Sheet for additional information. The date on the chart shown below is the date that the rotation is to begin.

328 D9 Conservation Crop Rotation: This rotation consists of row crops being grown for 1 year and small grains and/or grass crops being grown for 1 or more years. This rotation will be re-applied in the following years. The date on the chart shown below is the date that the rotation is to begin.

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328 D10 Conservation Crop Rotation:
This rotation consists of row crops being grown for a maximum of 2 years and small grains and/or grass crops being grown for 2 or more years. This rotation will be re-applied in the following years. The date on the chart shown below is the date that the rotation is to begin.

328 D11 Conservation Crop Rotation:
This rotation consists of row crops being grown for a maximum of 3 years and small grains and/or grass crops being grown for 3 or more years. This rotation will be re-applied in the following years. The date on the chart shown below is the date that the rotation is to begin.

328 D12 Conservation Crop Rotation:
Small grain, double-crop, row crop (optional) in small grain residue, followed by 5 or more years of alfalfa. The rotation will be repeated after the field has been in alfalfa at least 5 years. The date on the chart shown below is the date that the rotation is to begin.

328 D13 Conservation Crop Rotation:
This field will be used for continuous small grain production, with the option of double cropping and may also be planted to grasses/legumes. The date on the chart shown below is the date that the rotation is to begin.

328 D14 Conservation Crop Rotation:
This rotation consists of row crops being grown for one year followed by small grains with the option of double cropping for one or more years. This rotation will be re-applied in the following years. The date on the chart

shown below is the date that the rotation is to begin.

328 D15 Conservation Crop Rotation:
This rotation consists of row crops being grown for a maximum of five years and small grains and/or grass crops being grown for five or more years. This rotation will be re-applied in the following years. The date on the chart shown below is the date that the rotation is to begin.

328 D16 Conservation Crop Rotation:
This rotation consists of a maximum of two years row crops followed by one year or more of small grain with the option of double crop following the small grain harvest. This rotation will be re-applied in the following years. The date on the chart shown below is the date that the rotation is to begin.

328 D17 Conservation Crop Rotation:
This rotation consists of row crops being grown for a maximum of 4 years and small grains and or grass crops being grown for 2 or more years. This rotation will be re-applied in the following years. The date on the chart shown below is the date that the rotation is to begin.

328 D18 Conservation Crop Rotation:
This rotation consists of row crops being grown for a maximum of 4 years and small grains and/or grass crops being grown for 4 or more years. This rotation will be re-applied in the following year. The date on the chart shown below is the date that the rotation is to begin.

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